



(12) UK Patent (19) GB (11) 2 263 162 (13) B

(84) Title of invention

Torch

(61) INT CL: F21L 7/00

(21) Application No  
8200384.7

(22) Date of filing  
08.01.1992

(43) Application published  
14.07.1993

(45) Patent published  
04.10.1995

(72) Inventor(s)  
Si-Pu Chiu

(73) Proprietor(s)  
Lite Master Limited

(Incorporated in Hong Kong)

Unit 10  
19th Floor  
Technology Plaza  
20-25 She Tsz Road  
Tsuan Wan  
New Territories  
Hong Kong

(74) Agent and/or  
Address for Service  
Marks & Clark  
57-60 Lincoln's Inn Fields  
London  
WC2A 3LS  
United Kingdom

(82) Domestic classification  
(Edition N)  
F4R RFA R254

(55) Documents cited  
GB0367245 A  
GB0582458 A  
GB0533011 A  
GB0488327 A  
GB0415334 A  
GB0411218 A  
GB0245948 A  
US0585446 A

(66) Field of search

As for published application  
2263162 A viz:  
UK CL(Edition L) F4R RE RFA  
RL  
INT CL' F21L 7/00  
updated as appropriate

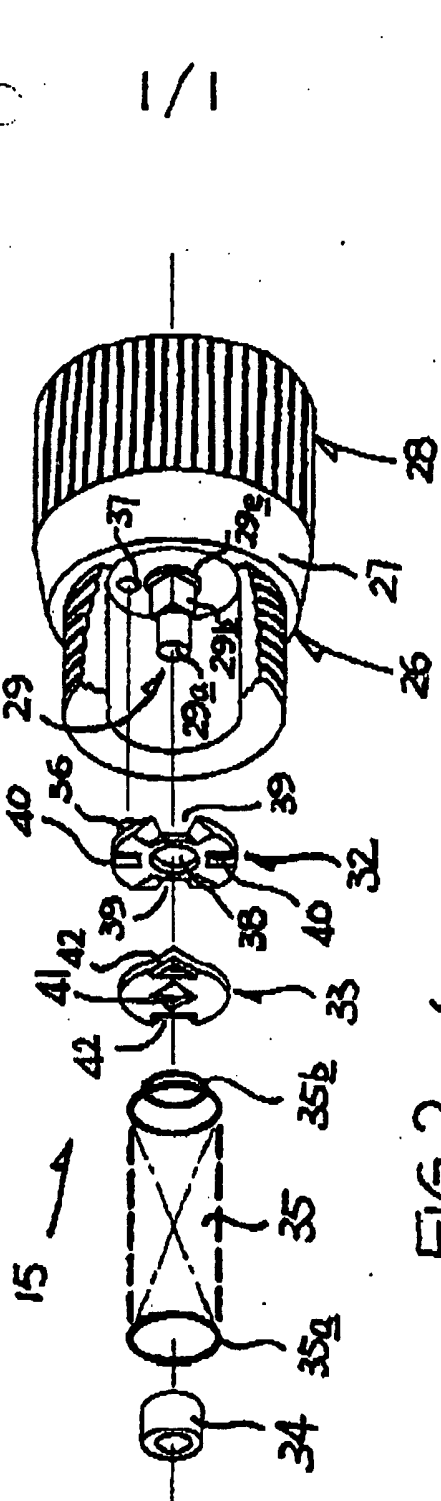


FIG. 2

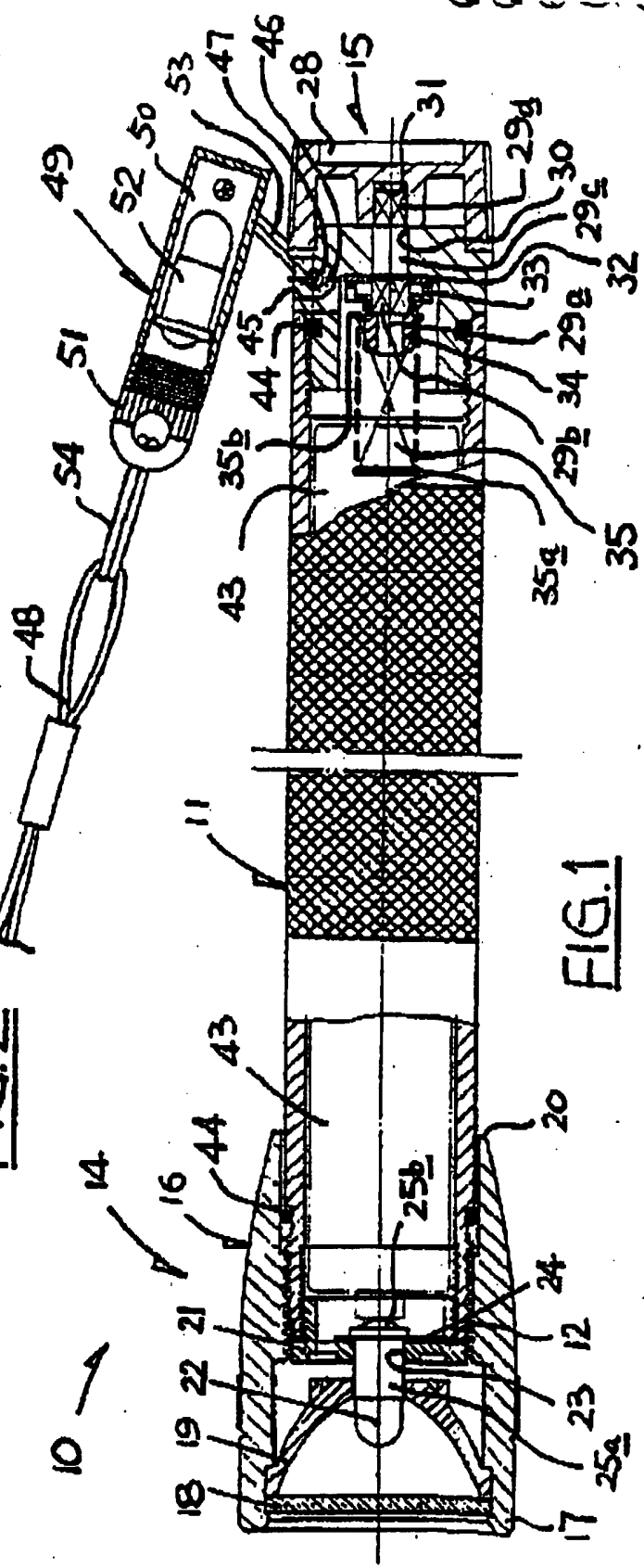


FIG. 1

2263162

TORCH

The present invention relates to a torch or flashlight.

According to the invention, there is provided a torch or flashlight which comprises an elongate barrel having a front end and a rear end and providing a battery compartment for accommodating a battery, a head assembly provided at the front end of the barrel and in which a light bulb is located, and a switch assembly provided at the rear end of the barrel, said switch assembly being operable upon a rotary action relative to and about a longitudinal axis of the barrel in a continuous manner in either one of two opposite directions in order to switch on and off the light bulb in an alternate manner by electrically connecting thereto or electrically disconnecting therefrom a said battery accommodated in the battery compartment.

Preferably, the switch assembly comprises first and second switch contacts which are movable relative to each other in a direction substantially parallel to the longitudinal axis of the barrel under the said rotary action of the switch assembly so as to come together into electrical contact or to separate apart.

It is preferred that the switch assembly further comprises an insulator located between the first and second switch contacts, relative rotation between the first switch

- 2 -

contact and the insulator resulting in a first relative position where the first and second switch contacts come together into electrical contact and in a second relative position where the first and second switch contacts are separated by the insulator.

Advantageously, the switch assembly is arranged to have distinctive angular positions through the said rotary action corresponding to switching-on and switching-off of the light bulb.

10 The first switch contact and the insulator may have corresponding co-operable formations which are engageable with each other in order to provide the said distinctive angular positions.

15 An arrangement is preferred such that the insulator is fixed against rotation and the first switch contact is rotatable relative thereto.

20 In a preferred embodiment, the first switch contact has a projection facing the second switch contact, and the insulator has a void through which the projection is arranged to pass in order to come into electrical contact with the second switch contact when the first switch contact and the insulator are in the first relative position.

Preferably, the first switch contact has a plurality of said projections which are equi-angularly spaced, and the insulator has a plurality of said voids which are also equi-angularly spaced.

6 The torch or flashlight may further comprise a spring which is arranged to resiliently bias the first and second switch contacts one towards the other when acting upon a said battery accommodated in the battery compartment.

10 In a preferred embodiment, the switch assembly comprises first and second parts, said first part being attached to the rear end of the barrel and said second part being rotatably connected to the first part so as to provide the said rotary action for the switch assembly to operate.

15 It is convenient that the first part of the switch assembly has a formation thereon or therein to which a ring, a strap, a cord or the like can be attached.

Preferably, the switch assembly is in the form of an end cap which is removable from the rear end of the barrel in order to open the battery compartment.

20 Preferably, the torch or flashlight further comprises a spare bulb holder which is attached to the outside of the torch or flashlight.

The spare bulb holder is preferred to be attached to the switch assembly and in particular to the first part of the switch assembly.

5 In a specific construction, the spare bulb holder comprises two body parts which are releasably connected together by screw engagement.

10 It is preferred that the torch or flashlight comprises a strap, chain, ring, hook or the like which is attached to the spare bulb holder for convenient handling or holding of the torch or flashlight.

The invention will now be more particularly described, by way of example only, with reference to the accompanying drawings, in which:

15 Figure 1 is a partially sectional side view of an embodiment of a torch in accordance with the invention; and

Figure 2 is an exploded perspective view of a switch assembly of the torch of Figure 1.

20 Referring to the drawings, there is shown an embodiment of a flashlight or torch 10 according to the invention, which torch 10 comprises a elongate tubular aluminum barrel 11 having a front end 12 and a rear end 13, a head assembly 14 provided at the front end 12 of the barrel 11, and a switch

assembly 15 provided at the rear end 13 of the barrel 11.

5 The head assembly 14 is formed by a generally tubular aluminium casing 16 having an open front end 17 across which a lens 18 is mounted. A parabolic reflector 19 is supported immediately behind the lens 18. The casing 16 converges slightly to its rear end 20 through which the front end 12 of the torch barrel 11 is screwed into the head assembly 14.

10 The front end 12 of the torch barrel 11 is closed by a bulb holder 21 in the form of a plastic cap which is screwed mostly into the front barrel end 12. Through a central aperture 23 of the bulb holder 21, there is supported a light bulb 22 which extends forwards into the parabolic reflector 19. The light bulb 22 has a cylindrical side terminal 25a which is electrically connected to the front end 12 of the torch barrel 11 by means of an electrically conducting strip 24, and has an end terminal 25b exposed on the inner side of the bulb holder 21.

20 Upon rotation of the head assembly 14 relative to the torch barrel 11, the former will slide co-axially forwards or rearwards with respect to the latter, whereby the axial position of the light bulb 22 relative to the parabolic reflector 19 is adjusted in order to achieve a focusing effect.

The construction of the switch assembly 15 is best shown in Figure 2, which includes an aluminum body 26 in the form of a can having its open end screwed in electrical contact into the rear end 13 of the torch barrel 11. The switch body 26 has a circular base plate 27, on the outside of which a plastic turning knob 28 is rotatably mounted by means of a plastic shaft 29. A recess 45 is formed in the peripheral surface of the switch body 26, within which there is provided a bisecting partition 46 having a hole 47. The partition 46 and the hole 47 provide a formation to which a strap 48 is attached via a spare bulb holder 49. The strap 48 is provided for convenient handling or holding of the torch 10, and may be replaced by a chain, ring, hook or the like.

The spare bulb holder 49 is formed by a can-like body 50 and a lid 51 which is releasably engaged within the body 50 by screw engagement. As shown in Figure 1, a spare bulb 52 is accommodated within the holder 49. The spare bulb holder 49 is connected at its body end to the switch assembly 15 by a ring 53 and at its lid end to the strap 48 by another ring 54.

The shaft 29 has four sections from front to rear ends, namely a circular first section 29a, a square second section 29b, a circular third section 29c and a square fourth section 29d, and further includes a flange 29e provided between the second and third sections 29b and 29c.



The third section 29c fits snugly but rotatably within a central circular hole 30 in the base plate 27 of the switch body 26. The fourth section 29g engages by friction within a square recess 31 provided inside the turning knob 28 and the flange 29g engages the inner side of the base plate 27, thereby holding the turning knob 28 in position co-axially with the torch barrel 11. With this arrangement, the shaft 29 is thus manually rotatable by means of the turning knob 28.

10 The switch assembly 16 further includes an electrically insulating plastic disc 32 and an electrically conducting metal disc 33 disposed together on the second section 29h of the shaft 29, with the plastic disc 32 sandwiched between the metal disc 33 and the inner side of the switch body base plate 27. The two discs 32 and 33 are held co-axially in position by a plastic collar 34 in co-operation with an electrically conducting coil spring 35. The collar 34 is press-fitted onto the first section 29a of the shaft 29. The coil spring 35 has a front end 35a and a rear end 35b, and is supported co-axially on the shaft 29, with its front end 35a projecting freely forwards, by reason of the reduced last turn at its rear end 35b trapped behind the collar 34.

25 The plastic disc 32 has a rearwardly extending off-centre stud 36 which engages within a hole 37 formed in the inner side of the switch body base plate 27, whereby the plastic

disc 32 is prevented from rotation. A central circular hole 38 is formed in the plastic disc 32, through which hole 38 the shaft 29 passes. The plastic disc 32 further includes a pair of diametrically opposite outouts 39 and a pair of diametrically disposed recesses 40, the outouts 39 and the recesses 40 being equi-angularly spaced.

The metal disc 33 has a central square hole 41 through and with which the second section 29b of the shaft 29 rotationally engages. The rim of the metal disc 33 is pressed to one side at two diametrically opposite positions in order to form two V-shaped projections 42 on the side facing the plastic disc 32.

The body of the torch barrel 11 provides a compartment for batteries 43 which are inserted into the barrel 11 one after another through the rear barrel end 13 when the switch assembly 15 has been unscrewed. On return of the switch assembly 15, which acts as an end cap, the batteries 43 will be held stationary by being pressed in electrical contact with and between the rear end terminal 25 of the light bulb 22 and the front end 35a of the coil spring 35.

The return electrical path for the side terminal (not shown) of the light bulb 22 is provided by the strip 24, the body of the torch barrel 11, the switch body 26, the metal disc 33 and the spring 35. With the batteries 43 in the barrel 11, the coil spring 35 will be subject to

compression, whereby its rear end 35b will press the metal disc 33 and in turn the plastic disc 32 against the inner side of the base plate 27 within the switch body 26.

5 In operation, when the projections 42 of the metal disc 33 align with the cutouts 39 of the plastic disc 32, the projections 42 pass through the corresponding cutouts 39 and come into electrical contact with the inner side of the switch body base plate 27, thereby completing the return electrical path and in turn the electrical circuit between  
10 the light bulb 22 and the batteries 43 and thus resulting in energization of the light bulb 22. Upon manual rotation of the turning knob 28 relative to the torch barrel 11, the metal disc 33 will be rotated by the shaft 38 relative to the stationary plastic disc 32. As soon as the projections  
15 42 of the metal disc 33 ride onto the plastic disc 32, the return electrical path will be interrupted and as a result the light bulb 22 will be switched off.

The recesses 40 are provided for the corresponding  
20 projections 42 to sit in so as to define a distinctive switch-off position for the turning knob 28. By virtue of the function of the plastic disc 32, the cutouts 39 define a distinctive switch-on position of the turning knob 28.

It will be appreciated that continuous rotation of the  
25 turning knob 28 will cause the switching-on and switching-off of the light bulb 22 in an alternate manner.

Each joint between the torch barrel 11 and the head assembly 14 or between the torch barrel 11 and the switch assembly 16 is fitted with a rubber O-ring 44 for water or splash proof.

- 5 The invention has been given by way of example only, and various modifications of and/or alterations to the described embodiment may be made by persons skilled in the art without departing from the scope of the invention as specified in the appended claims.

CLAIMS

- 5 1. A torch or flashlight comprising an elongate barrel having a front end and a rear end and providing a battery compartment for accommodating a battery, a head assembly provided at the front end of the barrel and in which a light bulb is located, and a switch assembly provided at the rear end of the barrel, said switch assembly being operable upon a rotary action relative to and about a longitudinal axis of the barrel in a continuous manner in either one of two opposite directions in order to switch on and off the light bulb in an alternate manner by electrically connecting thereto or electrically disconnecting therefrom a said battery accommodated in the battery compartment.
- 10 2. A torch or flashlight as claimed in claim 1, wherein the switch assembly comprises first and second switch contacts which are movable relative to each other in a direction substantially parallel to the longitudinal axis of the barrel under the said rotary action of the switch assembly so as to come together into electrical contact or to separate apart.
- 15 3. A torch or flashlight as claimed in claim 2, wherein the switch assembly further comprises an insulator located between the first and second switch contacts, relative rotation between the first switch contact and the insulator
- 20 25

resulting in a first relative position where the first and second switch contacts come together into electrical contact and in a second relative position where the first and second switch contacts are separated by the insulator.

- 5      4. A torch or flashlight as claimed in any one of claim 1 to claim 3, wherein the switch assembly is arranged to have distinctive angular positions through the said rotary action corresponding to switching-on and switching-off of the light bulb.
- 10     5. A torch or flashlight as claimed in claim 4 when dependent upon claim 3, wherein the first switch contact and the insulator have corresponding co-operable formations which are engageable with each other in order to provide the said distinctive angular positions.
- 15     6. A torch or flashlight as claimed in any one of claim 3 to claim 5, wherein the insulator is fixed against rotation and the first switch contact is rotatable relative thereto.
- 20     7. A torch or flashlight as claimed in any one of claim 3 to claim 6, wherein the first switch contact has a projection facing the second switch contact, and the insulator has a void through which the projection is arranged to pass in order to come into electrical contact with the second switch contact when the first switch

contact and the insulator are in the first relative position.

5 8. A torch or flashlight as claimed in claim 7, wherein the first switch contact has a plurality of said projections which are equi-angularly spaced, and the insulator has a plurality of said voids which are also equi-angularly spaced.

10 9. A torch or flashlight as claimed in any one of claim 2 to claim 8, further comprising a spring which is arranged to resiliently bias the first and second switch contacts one towards the other when acting upon a said battery accommodated in the battery compartment.

15 10. A torch or flashlight as claimed in any one of the preceding claims, wherein the switch assembly comprises first and second parts, said first part being attached to the rear end of the barrel and said second part being rotatably connected to the first part so as to provide the said rotary action for the switch assembly to operate.

20 11. A torch or flashlight as claimed in claim 10, wherein the first part of the switch assembly has a formation thereon or therein to which a ring, a strap, a cord or the like can be attached.

12. A torch or flashlight as claimed in any one of the

preceding claims, wherein the switch assembly is in the form of an end cap which is removable from the rear end of the barrel in order to open the battery compartment.

5 13. A torch or flashlight as claimed in any one of the preceding claims, further comprising a spare bulb holder which is attached to the outside of the torch or flashlight.

14. A torch or flashlight as claimed in claim 13, wherein the spare bulb holder is attached to the switch assembly.

10 15. A torch or flashlight as claimed in claim 14 when dependent upon claim 10, wherein the spare bulb holder is attached to the first part of the switch assembly.

15 16. A torch or flashlight as claimed in any one of claim 13 to claim 15, wherein the spare bulb holder comprises two body parts which are releasably connected together by screw engagement.

20 17. A torch or flashlight as claimed in any one of claim 13 to claim 16, further comprising a strap, chain, ring, hook or the like which is attached to the spare bulb holder for convenient handling or holding of the torch or flashlight.

18. A torch or flashlight, substantially as hereinbefore



- 15 -

described with reference to the accompanying drawings.

**THIS PAGE BLANK (USPTO)**

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☒ **BLACK BORDERS**
- ☒ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☒ **FADED TEXT OR DRAWING**
- ☒ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☒ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☒ **OTHER:** \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**

**This Page Blank (uspto)**